

What is claimed is:

1. In the process of making honeycomb articles by utilizing a co-rotating, intermeshing twin screw extrusion apparatus to mix, screen, and extrude a batch of ceramic materials through a die, the improvement which comprises the steps of separating said mixing and screening phase from said extrusion phase, by passing said batch through a first co-rotating, intermeshing twin screw extruder to mix and screen said batch, and then directly passing said mixed and screened batch through a second co-rotating, intermeshing twin screw extruder to extrude said batch through a die to produce a honeycomb article.
2. The improved process of claim 1 wherein said mixing phase in said first co-rotating, intermeshing twin screw extruder includes shearing and plasticizing said batch.
3. The improved process of claim 1 wherein said screening phase in said first co-rotating, intermeshing twin screw extruder includes passing said batch through a filtering screen.
4. The improved process of claim 1 wherein said filtering screen has a screen opening size of between 30  $\mu\text{m}$  and 100  $\mu\text{m}$ .
5. The improved process of claim 1 wherein said extrusion phase in said second co-rotating, intermeshing twin screw extruder includes de-airing said batch.
6. The improved process of claim 1 wherein said batch is pressurized in said extrusion phase to about 2500-3000 psi.
7. The improved process of claim 1 wherein said batch is de-aired in said first co-rotating, intermeshing twin screw extruder.

8. A process for making a honeycomb ceramic structure, the method comprising the steps of:

- 5 (a) providing a batch of ceramic materials;
- (b) passing said batch through a first co-rotating, intermeshing twin screw extruder to mix and screen said batch;
- (c) passing said batch through a second co-rotating, intermeshing twin screw extruder to de-air and convey said batch;
- 10 (d) forcing said batch through a die assembly to produce a honeycomb cellular structure.

9. The process of claim 8 wherein said batch comprises dry ingredients and wet ingredients.

15 10. The process of claim 9 wherein said batch comprises between about 50-75 % by weight said dry ingredients.

11. The process of claim 9 wherein said batch comprises between about 25-50 % by weight said wet ingredients.

20 12. The process of claim 8 wherein said batch is de-aired in said first co-rotating.

25 13. The process of claim 8 wherein said batch is screened at a pressure of up to about 5000 psi.

14. The process of claim 14 wherein said batch is screened at a pressure of about 2000 psi.

30 15. The process of claim 8 wherein said batch is forced through said die assembly at a pressure of up to about 5000 psi.

10066377-013002

16. The process of claim 15 wherein said batch is forced through said die assembly at a pressure of about between 2500-3000 psi.

17. An apparatus for extruding a ceramic honeycomb article comprising:

5 a first co-rotating, intermeshing twin screw extruder for mixing and screening a batch of ceramic material, said first twin screw extrusion apparatus comprising a first feed inlet at one end, a first discharge outlet at the other end, and a filtering screen detachably mounted adjacent said first  
10 discharge outlet;

a second co-rotating, intermeshing twin screw extruder downstream from said first twin screw extruder for extruding said batch through a die assembly, said second twin screw extruder comprising a second feed inlet  
15 at one end corresponding to said first discharge outlet of said first twin screw extruder and a second discharge outlet at the other end;

means for linking said first co-rotating, intermeshing twin screw extruder to said second co-rotating, intermeshing twin screw extruder;

20 a die assembly attached to said second discharge outlet of said second twin screw extruder for producing a honeycomb article.

18. The apparatus of claim 17 wherein said means for linking said first twin screw extruder to second twin screw extruder include an adapter device.

19. The apparatus of claim 17 wherein said adapter device has a front end and a back end.

20. The apparatus of claim 19 wherein said front end has a front hole and said back end has a back hole.

10066377 0130002

21. The apparatus of claim 20 wherein said front hole is greater than said back hole.

22. The apparatus of claim 19 wherein said front end of said adapter device is attached to said first discharge outlet of said first twin screw extruder and said back end of said adapter device is attached to said second feed inlet of said second twin screw extruder.

23. The apparatus of claim 17 wherein said second co-rotating, intermeshing twin screw extruder further includes a die-protection screen detachably mounted adjacent said second discharge opening.

24. The apparatus of claim 23 wherein said die-protection screen has a screen size with openings of greater than 120  $\mu\text{m}$ .

25. The apparatus of claim 17 wherein said filtering screen has a screen size with openings of between 30  $\mu\text{m}$  and 100  $\mu\text{m}$ .

26. The apparatus of claim 17 wherein said second twin screw extruder is perpendicularly mounted to said first twin screw extruder.